
FREEDOM STAR

Return to Flight SPOTLIGHT

ISSUE 4

SOLID ROCKET BOOSTER

Cover Photo: *NASA retrieval ship* Freedom Star *returns to port following SRB recovery operations.*

NitroCision™ Technology Highlights RTF Effort

Putting the separation motors on the Solid Rocket Boosters (SRB) is a straightforward process. Taking them off – without disturbing the surrounding metal and its thermal protection coating – is another matter entirely.

When the SRB Program managers decided that the booster separation motors (BSM) needed to come off to be replaced by a new and improved model with a re-designed igniter, engineers were faced with the daunting task of cutting through up to four inches of thermal insulating material that is nearly impenetrable.

This material, called Booster Trowelable Ablative (BTA) covers the booster motors and other parts of the SRB surface. It is a high performance material designed to endure the rigors of launch and water splash down. BTA is not intended to come off easily. Removal of this ablative on live Booster Separation Motors had never been attempted, and no method was available.

In May of 2003 NASA's Industrial Engineering for Safety (IES) program, in conjunction with NASA Marshall Space Flight Center and USA Materials Engineers, started working with NitroCision™ of Idaho Falls, Idaho, to determine the feasibility of using Liquid Nitrogen blasting techniques to remove the BSM thermal insulation.

The collaborative efforts of NitroCision™, USA and NASA engineers led to an extensive test program to demonstrate how an ultra-high pressure stream of cryogenic liquid nitrogen (LN2) could remove the ablative without damage to or contamination of the surrounding flight hardware components. The ability of LN2 to evaporate without causing a secondary waste stream made it an excellent candidate for the tedious task of ablative removal from the BSM cases.

Six months after testing began, NitroCision™ technicians, supported by USA personnel, began the removal of 56 BSMs from 14 Aft Skirt assemblies in the SRB Assembly and Refurbishment Facility. The otherwise labor intensive manual operation was reduced to just two days per structure.

Thanks to the dedication of the SRB Project Team, this RTF effort is nearing completion. NASA IES continues to test the NitroCision™ technology for potential use across the Space Shuttle Program. The benefit to current and future NASA Programs will help ensure support for "The Vision of Space Exploration."

NitroCision™ Specifications:
Operating Pressure: 5000 to 60,000 PSIG
Operating Temperature: 100 o - 250
Fluid Velocity: ~ Mach 3

Capabilities:
Coating Removal, Precision Cutting, and De-Contamination

For more information visit the NASA website at http://www.nasa.gov